acutherm™
Therma-Fuser™ Systems

TL Therma-Fuser™

Linear Thermally Powered VAV Diffuser

Models:

TL-C VAV cooling only
TL-CW VAV cooling with constant volume warm up
TL-D Manually adjustable blades
TL-RAD Return air, ducted
TL-RAP Return air, plenum

TL: Product Overview
FORM 061.101 REV 1604

BENEFITS AT A GLANCE.

INDIVIDUAL COMFORT SELECTION AND CONTROL

Every Therma-Fuser™ diffuser is a VAV zone of temperature control providing pleasing comfort. The built-in thermostat senses average room air temperature from a sample of air induced into the unit. It controls airflow to precisely match the comfort requirements of the room or portion of the room served. Occupants breathe easier knowing that their personal temperature choice is concealed and will not be changed by someone else.

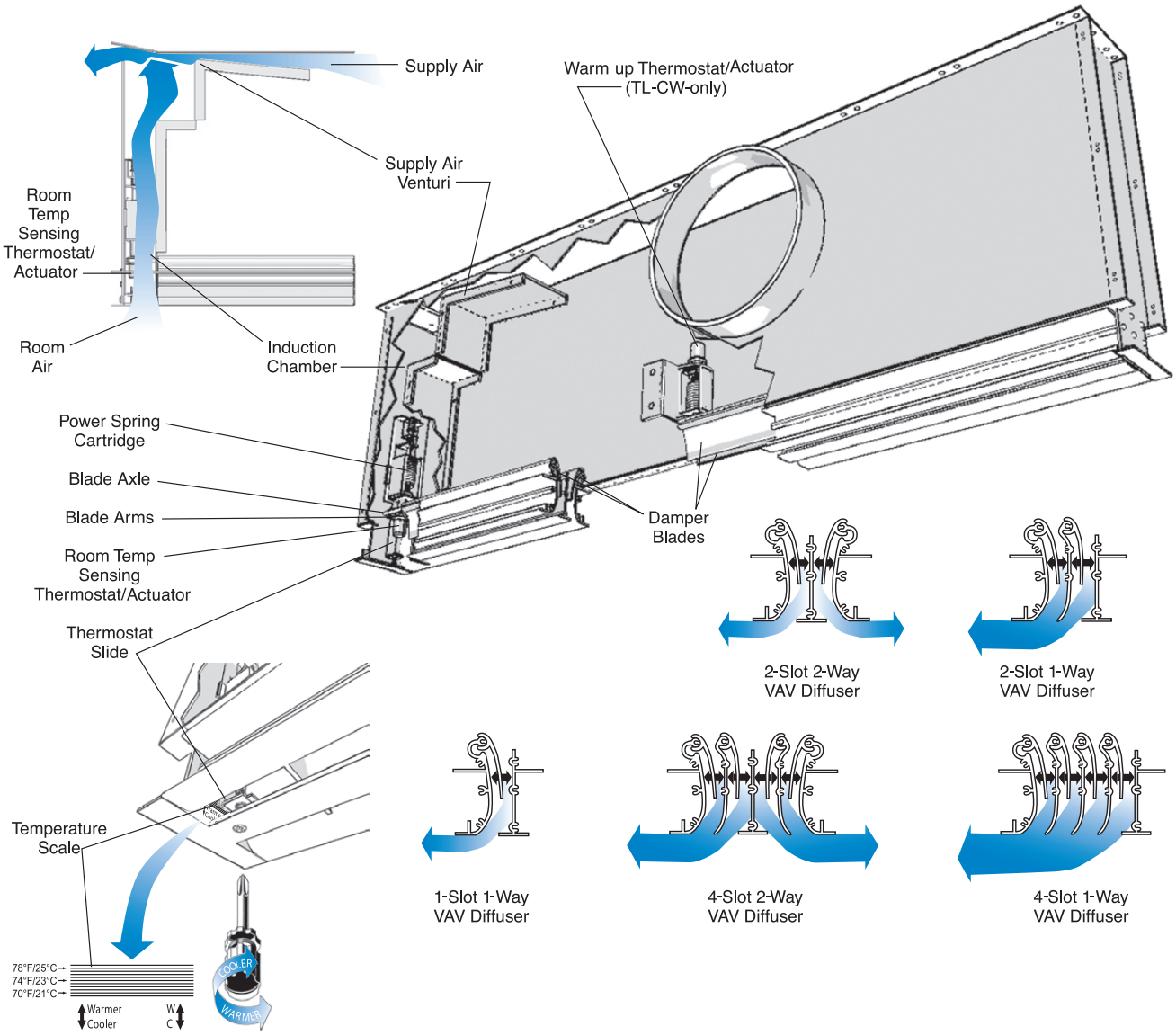
SLEEK LINEAR PROFILE

Streamlined aluminum extrusions provide slim trim architectural shape and aerodynamic air distribution. The smooth shape unobtrusively and attractively blends into virtually any ceiling design. Close tolerances inherent in the extruded control damper and diffusion surfaces produce consistent Coanda and the comfort of no dumping at any airflow.

ONLY THERMA-FUSER VAV OFFERS THESE BENEFITS

- Superior air distribution—longer throws, no dumping, more entrainment, even temperature distribution, higher ADPI* and better room air change effectiveness.
- Lowest cost per zone of control.
- Lowest energy VAV terminal—green VAV.
- Low to no maintenance—10 year warranty.
- Easily adapts to office changes.

*ADPI (Air Diffusion Performance Index) is defined in the ASHRAE Fundamentals Handbook.



HOW IT WORKS

Model TL Therma-Fuser diffusers are linear ceiling diffusers with built-in temperature controls and VAV damper. The damper blades open and close, metering airflow into the room in response to room temperature. The damper is mechanically positioned by a thermostat/actuator, that is both room thermostat and damper motor.

The room thermostat/actuator is a large brass cylinder containing a petroleum-based wax. The wax melts and expands when heated, pushing against a fixed piston that moves the thermostat outward. A heavy spring pulls the thermostat inward when the wax cools and contracts. Four-slot models have two thermostat/actuators.

ROOM AIR SENSING

As with all diffusers, air circulates around the room in a circular motion. Secondary air rises under the diffuser, passes beneath the diffuser and entrains with the primary air at the outside edge of the diffuser. This secondary air best represents average room temperature.

To monitor average room temperature, a continuous sample of secondary air is drawn up into the induction chamber and over the thermostat by the action of a venturi fed by supply air. This venturi is located at the top of the induction chamber. A properly applied TL will hold the room average within 1.5°F/0.9°C of the temperature selected.

COOLING MODE

In the cooling mode, the damper blades open on a rise in room temperature. As the room warms, the wax in the room thermostat melts and expands. This pushes the damper blades open. When the room cools, the wax contracts and the spring pulls the damper blades closed.

CHANGEOVER (TL-CW ONLY)

Changeover between the cooling and heating modes is determined by supply air temperature. A second thermostat/actuator (two in the four-slot models) located near the inlet, senses supply air temperature. Supply air temperature above 80°F/26.5°C fully opens the damper blades for constant volume heating.

ADJUSTING TEMPERATURE SET POINT (TL-C and TL-CW)

The room temperature set point is adjusted by turning the Phillips screw with a Phillips screwdriver to move the thermostat slide up or down. Four-slot units have two thermostats, each controlling two slots, that are separately adjusted. The temperature scale, graduated in degrees and located behind the thermostat slide, can be viewed at the end of the diffuser slot. Turning the Phillips screw clockwise will move the slide down over the temperature scale for a cooler set point. Each graduation on the temperature scale is 1°F/.55°C.

The diffuser is factory set to maintain approximately 74°F / 23°C. It is not necessary to adjust the temperature set point at time of installation. Instead, make any adjustments after the system has been started and the space is occupied. Then adjust only those Therma-Fuser diffusers where occupants are uncomfortable at the factory set point.

Readjust to the factory set point by turning the Phillips screw clockwise (cooler set point) until the thermostat slide hits the stop. Then turn counter clockwise (warmer) for seven turns.

CONSTRUCTION

Diffuser construction is extruded aluminum to maintain precise tolerances essential for proper air distribution. Close tolerances are especially critical in the throat area of the diffuser to achieve the necessary aerodynamic air pattern or Coanda effect along the surface of the ceiling. Powder coat is standard on all visible portions and provides a quality appearance.

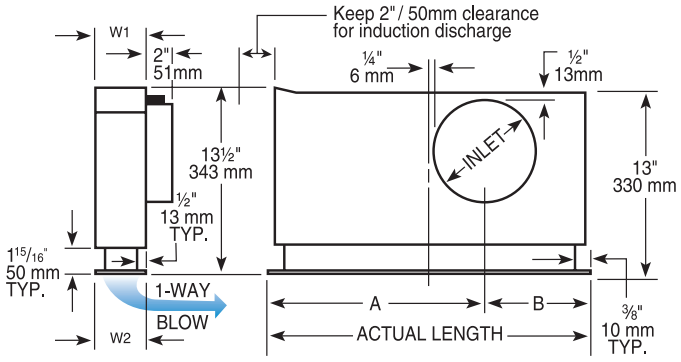
Power compression springs are contained in cartridges attached directly to the thermal elements. This closely contains the forces needed to cause the element to retract when cooled, thereby avoiding distortion of other diffuser parts to assure accuracy of control.

Plenum construction is heavy-duty 24-gauge galvanized steel to minimize damage during shipment and installation.

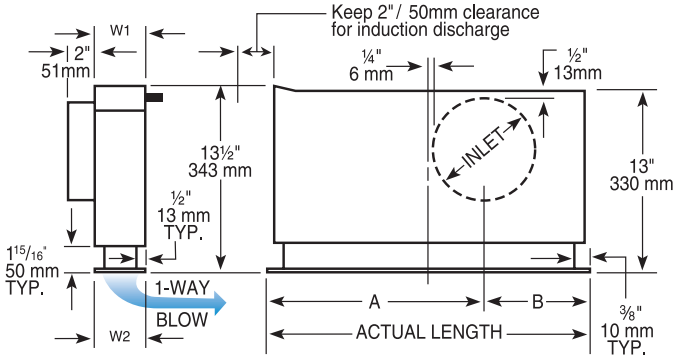
Insulation (optional) is ½" fiber-free foam adhered with ASTM C 916 adhesive. Insulation and adhesive meet NFPA 90A and 90B or equivalent.

DIMENSIONS: MODELS TL-C, TL-CW. TL-D AND TL-RAD

STANDARD INLET - One-way blow diffusers blow toward the same side with the inlet.

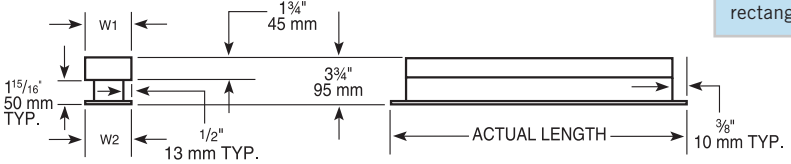


OPPOSITE INLET - One-way blow diffusers blow away from the side with the inlet.

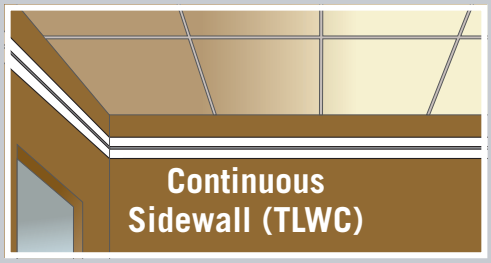


←INLET→
Contact Acutherm for dimensions of rectangular top inlet.

MODELS TL-RAP ‡



Linear Therma-Fuser™ Diffusers are also available in continuous ceiling and sidewall models.



For information on sidewall diffusers, see Acutherm's TLW brochure.

ONE- AND TWO-SLOT

						W2		
Nominal length	Actual length*	Inlet	A	B	W1	1-Slot 1-Way	2-Slot 1-Way	2-Slot 2-Way
24	23¾ in 603mm	5⅞ in 150mm	15 1/16 in 382mm	8 11/16 in 221mm	4 in 102mm	2 9/16in 65mm	3¾in 95mm	4 in 102mm
36	35¾ in 908mm	5⅞ in 150mm	21 1/16 in 535mm	14 11/16 in 373mm	4 in 102mm	2 9/16in 65mm	3¾in 95mm	4 in 102mm
48	47¾ in 1213mm	7⅞ in 200mm	28 1/16 in 713mm	19 11/16 in 500mm	4 in 102mm	2 9/16in 65mm	3¾in 95mm	4 in 102mm
60	59¾ in 1518mm	7⅞ in 200mm	34 1/16 in 865mm	25 11/16 in 653mm	4 in 102mm	2 9/16in 65mm	3¾in 95mm	4 in 102mm

FOUR-SLOT

						W2	
Nominal length	Actual length*	Inlet	A	B	W1	4-Slot 1-Way	4-Slot 2-Way
24	23¾ in 603mm	7⅞ in 200mm	15 1/16 in 382mm	8 11/16 in 221mm	6 5/16in 160mm	6 in 153mm	6⅜in 162mm
36	35¾ in 908mm	7⅞ in 200mm	21 1/16 in 535mm	14 11/16 in 373mm	6 5/16in 160mm	6 in 153mm	6⅜in 162mm
48	47¾ in 1213mm	9⅞ in 250mm	28 1/16 in 713mm	19 11/16 in 500mm	6 5/16in 160mm	6 in 153mm	6⅜in 162mm
60	59¾ in 1518mm	11⅞ in † 300mm †	34 1/16 in 865mm	25 11/16 in 653mm	6 5/16in 160mm	6 in 153mm	6⅜in 162mm

Dimensions for models TL-D and TL-RAD are the same as shown for models TL-C and TL-CW. Dimensions for model TL-RAP are shown in the installation instructions, Form 21.2. See Model Designation on page 6 for descriptions of model TL-D, TL-RAD and TL-RAP.

† Oval shaped inlet
* 595, 895, 1195 AND 1495mm lengths are available to fit metric ceilings.
‡ TL-RAP is also available in actual lengths of 71¾".
- Dimensions ±1/16"/±1.6mm

SELECTION GUIDELINES

Minimum/Maximum Spacing—Use the throw ratings for design air volume (maximum flow in the Performance Guide) to determine distances for minimum and maximum spacing to walls and other diffusers. Below design air volume, room air motion will be kept to acceptable levels by the increasing entrainment ratio as the diffuser turns down.

Less than 100fpm / 0.51m/s (interpolate) is normally satisfactory for air discharged against an inside partition and up to 150fpm / .076m/s can be tolerated against an outside wall. Maximum throw is usually figured around the 50fpm / 0.25m/s point.

When given a choice, put diffusers in line with one another, not blowing at each other. When unavoidable, space diffusers at least two times the 150fpm / 0.76m/s throw (preferably two times the 100fpm / 0.51m/s throw) to avoid down drafts.

Maximum center line spacing between diffusers in line (in the same row) should be three to four times the unit's length. A 48in / 1200mm diffuser would then cover an area 12 to 16ft / 3.6 to 4.8m wide (maximum).

Layouts should be made on a reflected ceiling plan (looking down from above the ceiling). Make the ceiling grid and lighting layouts first, then the diffuser layout. The center of the room is often an ideal location for a 2-way blow diffuser, but if the lighting gets there first, Acutherm diffusers have enough flexibility to provide good air distribution when not centered. Where large air quantities are required, a frequently used arrangement is “staggered” with alternate rows blowing 1-way in opposite directions.

Do not obstruct the venturi outlet at the end of the diffuser. Allow a spacing of 2in / 50mm or more between the venturi opening at the end of the diffuser and lights, joists, other diffusers, etc.

Acutherm diffusers are designed for mounting in place of a portion of a ceiling panel. They are not intended to straddle or replace a ceiling T-bar. *(See Acutherm's brochure on Ceiling Approaches.)*

Return Air may be handled in the conventional manner using return air grills or, more typically, return air slots can be provided to match the supply air diffusers. Use of return air slots will generally improve air distribution in the space and blend into the overall ceiling pattern along with the supply air diffusers.

Each space should have returns. Select returns with the same total length of slot as the supply air diffusers in the space. Arrangement should be in line with or perpendicular to the supply diffusers. If return air slots must be located in the supply air stream, place them beyond the 50fpm / 0.25m/s throw for the supply air diffuser.

Horizontal air discharge streams are not affected by ceiling beams or other construction under 2in / 50mm in height provided they are at least 2ft / 600mm from the diffuser. Obstructions greater than 2in / 50mm will cause downward air deflection and objectionable drafts. Within 2ft / 600mm from the diffuser, obstacles should not extend more than 1/16in / 1.5mm below the plane of the bottom of the diffuser.

PERFORMANCE GUIDE in I-P UNITS

2-Slot 2-Way Linear

Nominal Length in	Inlet Static Pressure in wg	Maximum Flow cfm	Maximum Flow		25% Maximum Flow	
			Throw - Feet* @ v_t=50/100/150FPM	†NC	Throw* - Feet @ v_t=50/100/150FPM	†NC
24	.05	70	4/3/2	<15	3/<1/<1	<15
	.10	90	5/4/3	<15	4/3/<1	<15
	.15	120	9/7/4	21	6/4/3	20
	.18	135	10/8/5	23	7/5/3	22
	• .20	145	10/8/5	25	7/5/3	24
	.25	165	13/10/7	30	8/6/4	29
36	.05	80	4/3/2	<15	3/<1/<1	<15
	.10	115	7/5/3	16	4/3/<1	<15
	• .14	143	9/7/5	22	6/4/2	21
	.15	150	9/7/5	23	6/4/2	22
	.20	170	11/9/7	28	7/5/3	27
	.25	185	13/10/8	32	8/6/4	31
48	.05	150	7/5/3	<15	4/3/<1	<15
	.10	200	11/9/7	20	6/4/2	19
	.15	240	13/11/9	25	8/6/4	25
	• .17	256	15/12/9	27	9/6/4	27
	.20	280	17/14/10	29	10/7/5	29
	.25	310	19/15/11	33	12/9/6	32
60	.05	170	6/4/3	<15	4/3/<1	<15
	.10	240	8/6/4	20	5/3/2	19
	• .12	260	9/7/4	22	6/3/2	21
	.15	290	10/8/5	26	7/4/3	25
	.20	330	14/11/7	31	9/6/4	30
	.25	370	18/14/9	34	11/8/5	33

2-Slot 1-Way Linear

Nominal Length in	Inlet Static Pressure in wg	Maximum Flow cfm	Maximum Flow		25% Maximum Flow	
			Throw - Feet* @ v_t=50/100/150FPM	†NC	Throw* - Feet @ v_t=50/100/150FPM	†NC
24	.05	65	6/4/3	<15	4/3/<1	<15
	.07	75	7/5/4	17	5/3/<1	17
	.10	90	9/7/5	20	6/4/2	19
	.15	110	14/11/7	25	9/6/4	24
	.20	130	17/13/8	29	10/7/5	28
	• .25	145	19/14/9	32	12/9/6	31
36	.05	85	5/3/2	16	3/<1/<1	<15
	.10	120	9/7/5	23	5/4/2	22
	.12	130	11/8/6	24	6/5/3	23
	• .15	145	13/10/7	26	8/6/4	25
	.20	165	16/12/8	30	10/7/5	29
	.25	180	18/14/9	33	12/9/6	32
48	.05	150	8/6/4	17	5/4/2	<15
	.10	200	15/13/8	24	9/6/4	20
	.15	240	22/17/11	30	13/9/6	26
	• .17	256	23/17/11	31	13/10/6	27
	.20	280	24/18/12	32	14/11/7	28
	.25	310	25/19/13	35	15/12/7	31
60	.05	170	6/4/3	17	4/3/<1	16
	.10	230	14/11/7	24	8/6/4	23
	• .13	263	17/13/8	28	11/7/5	27
	.15	280	19/14/9	30	12/8/5	29
	.20	320	20/15/10	32	12/9/6	31
	.25	360	22/17/11	35	13/10/6	34

1-Slot 1-Way Linear

Nominal Length in	Inlet Static Pressure in wg	Maximum Flow cfm	Maximum Flow		25% Maximum Flow	
			Throw - Feet* @ v_t=50/100/150FPM	†NC	Throw* - Feet @ v_t=50/100/150FPM	†NC
24	.05	45	6/4/3	<15	4/3/<1	<15
	.10	60	9/7/4	19	6/4/2	<15
	.15	70	13/10/7	23	8/6/4	16
	◉.18	76	15/11/8	25	9/7/5	19
	.20	80	17/12/8	27	10/8/5	21
	.25	90	19/14/9	30	12/9/6	24
36	.05	70	6/4/3	<15	4/3/<1	<15
	◉.07	78	8/6/4	17	5/3/<1	<15
	.10	90	10/8/6	20	6/4/2	<15
	.15	110	13/10/7	24	8/6/4	17
	.20	125	18/14/9	28	10/7/5	21
	.25	140	20/15/10	31	12/9/6	24
48	.05	90	6/4/3	16	4/3/<1	<15
	.10	125	14/10/6	23	8/6/4	17
	◉.12	135	16/12/7	25	10/7/4	18
	.15	150	20/14/8	28	12/8/5	20
	.20	175	21/15/9	31	13/10/6	24
	.25	190	22/17/11	34	14/12/7	28
60	.05	100	6/5/4	17	4/3/<1	<15
	◉.09	140	9/7/6	23	6/4/2	18
	.10	150	10/8/6	24	6/4/2	19
	.15	180	15/13/8	30	9/6/4	23
	.20	210	17/13/9	32	10/7/5	26
	.25	230	20/15/10	35	12/9/6	29

PERFORMANCE GUIDE in I-P UNITS CONTINUED

4-Slot 2-Way Linear

Nominal Length in	Inlet Static Pressure in wg	Maximum Flow cfm	Maximum Flow		25% Maximum Flow	
			Throw - Feet* @ v_t=50/100/150FPM	†NC	Throw* - Feet @ v_t=50/100/150FPM	†NC
24	.05	150	4/3/2	<15	3/2/<1	<15
	.10	210	7/5/3	23	4/3/<1	22
	.13	240	8/6/4	25	5/4/2	24
	•.15	260	9/7/5	26	5/4/2	25
	.20	300	11/9/7	30	7/5/3	29
	.25	335	13/11/8	33	8/6/4	32
36	.05	185	5/4/3	<15	3/2/<1	<15
	•.10	260	8/6/4	23	5/4/2	22
	.13	296	9/7/5	25	6/5/3	24
	.15	320	10/8/6	27	6/5/3	26
	.20	370	12/10/8	31	8/6/4	30
	.25	410	14/12/9	34	9/7/4	33
48	.05	275	8/7/5	<15	5/4/3	<15
	.10	390	11/9/7	25	9/7/4	24
	•.11	408	12/10/7	26	10/8/5	25
	.15	480	14/12/9	32	12/10/7	31
	.20	550	17/14/10	37	14/12/8	36
	.25	620	20/17/12	39	16/14/10	38
60	.05	430	9/8/6	20	5/4/3	<15
	•.09	570	11/10/8	28	8/6/4	19
	.10	605	12/10/8	30	9/7/4	20
	.15	745	16/14/10	35	14/11/7	29
	.20	860	19/16/12	39	15/13/8	34
	.25	960	21/18/13	42	18/15/10	36

4-Slot 1-Way Linear

Nominal Length in	Inlet Static Pressure in wg	Maximum Flow cfm	Maximum Flow		25% Maximum Flow	
			Throw - Feet* @ v_t=50/100/150FPM	†NC	Throw* - Feet @ v_t=50/100/150FPM	†NC
24	.05	150	6/5/3	<15	4/3/<1	<15
	.10	210	13/10/7	26	8/6/4	24
	.13	240	17/13/8	27	10/7/5	25
	•.15	260	19/15/9	28	11/8/5	26
	.20	300	20/16/10	33	12/9/6	31
	.25	335	21/18/12	36	13/10/7	34
36	.05	180	6/5/4	<15	4/3/<1	<15
	.10	250	14/12/8	26	8/6/4	24
	• .11	262	15/12/8	27	9/6/4	25
	.15	310	19/14/10	30	11/8/5	28
	.20	360	21/18/12	34	13/10/7	32
	.25	400	22/19/13	37	14/12/7	35
48	.05	315	16/13/9	<15	9/7/4	<15
	• .08	393	18/15/11	23	10/8/5	22
	.10	445	20/17/12	28	10/8/5	26
	.15	545	26/23/16	34	13/10/7	32
	.20	630	35/29/21	38	19/15/9	36
	.25	700	37/32/24	42	21/18/12	39
60	.05	400	17/14/11	16	9/7/4	<15
	.10	570	25/22/15	28	12/10/7	20
	•.11	596	26/23/16	29	13/11/7	22
	.15	700	32/26/18	34	15/13/9	31
	.20	805	36/30/22	38	21/16/12	36
	.25	903	40/33/25	41	25/19/14	38

- • Denotes 750 fpm / 3.81 m/s inlet velocity. ◉ Denotes 400 fpm / 2.03 m/s inlet velocity.
- * Throw data is for air 20°F/11°C lower than room temperature. Throws for isothermal air are 40 to 50% greater.
- † NC based on L_w(10^{-12} watts reference) -10db.
- - Ratings independently verified by Inchcape Testing Services, ETL Testing Laboratories.
- - Tested in accordance with ANSI/ASHRAE 70-1991, ANSI S12.31, ARI 890-2001, ISO 5219 and ISO 3741.

The volume of induction air (into the ceiling) required in addition to rated air volume is:		
Inlet SP In. wg	1- and 2-Slots CFM	4-Slots CFM
.05	7	11
.10	9	14
.15	11	17
.20	12.5	20

SYSTEM DESIGN

The best control for heating/cooling units supplying air to VAV terminals is a discharge thermostat that maintains a constant supply air temperature. With DX equipment, this is a low limit. Use a room thermostat for changeover between heating and cooling modes. For hybrid systems (part VAV and part constant volume), control the heating/cooling supply unit with a thermostat in one of the rooms with a constant volume diffuser, preferably the space with the greatest load. For both VAV or hybrid systems, the fan should run continuously.

Static pressure at the inlet of the Therma-Fuser diffuser should be between .05"wg / 12Pa and .25"wg / 62Pa, at full and partial airflows. Static pressure below .05"wg / 12Pa will result in low airflow and less induction. Above .25"wg / 62Pa, Therma-Fuser diffusers operate well, but excessive noise may result.

If the system turns down more than 30%, static pressure should be controlled. Included in the options for static pressure control are fan speed control and modulating bypass dampers. Modulating zone dampers are recommended where several diffusers share a higher pressure duct or riser.

When designing ducts, if Therma-Fuser diffusers are to deliver nominal volume at inlet static pressure of .15"wg / 37Pa and if a maximum static pressure of .25"wg / 62Pa is to be held for quiet operation, size the duct for a maximum pressure drop of .1"wg / 25Pa between the first and last takeoff.

Manual balancing dampers should be used at the takeoff for each diffuser. Manual balancing dampers may not be required with ducts designed to Acutherm specifications.

A short length of low pressure flexible duct should be used to connect the diffuser. To avoid static pressure losses, flexible duct runs should be designed and installed as straight as possible (equivalent of one 90° turn max.) and should NOT be formed in a centerline radius of less than 1½ times the duct diameter.

Because Therma-Fuser diffusers control room temperature by sensing room air induced up the center of the space, care should be taken not to disturb room air induction and entrainment. For example, location next to walls or dropped lights results in the reflection of primary air back at the Therma-Fuser diffuser. To avoid this, relocate either the Therma-Fuser diffuser or the light.

Acutherm has "how to" system design brochures for almost every ducted air system.

GUIDE SPECIFICATION

(Suitable for Section 23 36 16 Variable Air Volume Units of the CSI Master Format). *Material in italics applies only to model TL-CW. Delete the italics for model TL-C.)*

2.2 Thermally-Powered VAV Diffusers

A. Thermally-powered VAV diffusers shall be a complete VAV terminal and thermostat self-contained in a linear diffuser. They shall be thermally powered with room thermostat/actuator *and changeover thermostat/actuator*. External wiring or pneumatics shall not be allowed.

B. The room thermostat/actuator shall open damper blade(s) on a rise in room temperature and modulate airflow to control the space within 1½°F/0.9°C of temperature setting. The temperature setting shall be adjustable between 70°F/21°C and 78°F/26°C. The initial set point shall be factory set at 74°F/23°C.

C. The diffuser and blades shall be constructed of extruded aluminum with all visible portions powder coated. The diffuser shall be complete with plenum constructed of 24-gauge galvanized steel.

D. The diffuser shall have an induction chamber and supply air venturi at one end for inducing room air past the room sensing thermostat/actuator. The venturi shall be at least 4 in. / 100 mm wide for effective induction. The VAV diffusers shall have positive induction of secondary room air over the room thermostat at all flows from fully closed to fully open.

E. Manufacturer's ratings for flow and sound shall be verified by an independent testing laboratory certified for ARI 890 and ADC testing

F. *The TL-CW unit shall be equipped with a changeover thermostat/actuator to fully open the diffuser for warm up at supply air temperatures of 80°F/26.5°C or more.*

G. Power compression spring cartridges shall be attached directly to the thermostat/actuators to contain the forces produced without distorting other parts of the diffuser and assure accuracy of control.

H. Optional—The diffuser shall be lined with ½" fiber-free foam insulation adhered with ASTM C 916 adhesive. The insulation and adhesive shall meet the requirements of NFPA 90A and 90 B.

I. Cooling supply air to the VAV diffuser shall be constant temperature (may be reset to another constant temperature). Supply air shall be limited to no lower than 50°F/10°C.

J. All VAV diffusers shall warrant that the diffuser shall be free from defects in materials and workmanship for a period of ten years from date of shipment.

PERFORMANCE GUIDE in SI (METRIC) UNITS

2-Slot, 2-Way Linear

Nominal Length mm	Nominal Inlet Dia. mm	Inlet Static Pressure Pa	Maximum Flow		Maximum Flow Throw (m)*@v_t =				25% Maximum Flow Throw (m)*@v_t =			
			L/s	m³/h	.25 m/s	.50 m/s	.75 m/s	†NC	.25 m/s	.50 m/s	.75 m/s	†NC
600	150	10	31	112	1.2	0.9	0.6	< 15	0.9	< 0.3	< 0.3	< 15
		20	39	140	1.4	1.1	0.8	15	1.1	0.7	< 0.3	< 15
		30	48	174	2.0	1.6	1.1	17	1.5	1.1	0.6	17
		40	59	213	2.8	2.2	1.3	22	1.9	1.3	0.9	21
		• 50	69	247	3.1	2.5	1.6	25	2.1	1.5	0.9	24
		60	76	274	3.8	3.0	2.1	29	2.4	1.8	1.2	28
900	150	10	35	124	1.0	0.8	0.6	< 15	0.9	< 0.3	< 0.3	< 15
		20	48	172	1.8	1.3	0.8	16	1.1	0.7	< 0.3	< 15
		30	61	220	2.4	1.8	1.2	19	1.5	1.1	0.5	18
		• 40	73	262	2.8	2.3	1.7	24	1.9	1.3	0.7	23
		50	80	290	3.4	2.8	2.2	28	2.1	1.5	0.9	27
		60	86	310	3.9	3.0	2.4	31	2.4	1.8	1.2	30
1200	200	10	66	238	1.7	1.3	0.7	< 15	1.1	0.9	< 0.3	< 15
		20	85	307	2.9	2.3	1.7	18	1.6	1.1	0.5	17
		30	102	368	3.6	3.0	2.4	22	2.2	1.5	0.9	21
		• 40	117	423	4.2	3.6	2.8	26	2.6	1.9	1.3	26
		50	132	477	5.2	4.3	3.1	29	3.1	2.2	1.6	29
		60	144	518	5.7	4.6	3.4	32	3.6	2.7	1.8	31
1500	200	10	74	266	1.7	1.1	0.9	< 15	1.2	0.9	< 0.3	< 15
		20	100	361	2.2	1.6	1.1	18	1.4	0.9	0.5	17
		• 30	123	443	2.7	2.1	1.4	22	1.8	1.1	0.7	21
		40	141	508	3.3	2.7	1.7	27	2.3	1.4	1.0	26
		50	156	562	4.3	3.4	2.2	31	2.8	1.9	1.3	30
		60	171	617	5.3	4.1	2.7	33	3.3	2.4	1.5	32

2-Slot, 1-Way Linear

Nominal Length mm	Nominal Inlet Dia. mm	Inlet Static Pressure Pa	Maximum Flow		Maximum Flow Throw (m)*@v_t =				25% Maximum Flow Throw (m)*@v_t =			
			L/s	m³/h	.25 m/s	.50 m/s	.75 m/s	†NC	.25 m/s	.50 m/s	.75 m/s	†NC
600	150	10	28	102	1.7	1.1	0.8	<15	1.1	0.9	< 0.3	<15
		20	38	136	2.4	1.8	1.3	18	1.6	1.1	0.5	17
		30	46	167	3.4	2.7	1.8	22	2.2	1.5	0.9	21
		40	54	194	4.5	3.5	2.3	26	2.8	1.9	1.3	25
		50	61	221	5.2	4.0	2.5	29	3.1	2.2	1.6	28
		• 60	67	242	5.7	4.3	2.8	31	3.6	2.7	1.8	30
900	150	10	37	133	1.3	0.7	0.4	<15	0.8	0.1	< 0.3	<15
		20	50	181	2.3	1.7	1.2	20	1.3	0.9	0.5	19
		30	61	221	3.3	2.5	1.8	24	1.9	1.5	0.9	23
		• 40	70	254	4.1	3.2	2.2	27	2.6	1.9	1.3	26
		50	78	281	4.9	3.7	2.5	30	3.1	2.2	1.6	29
		60	84	302	5.4	4.2	2.8	32	3.6	2.7	1.8	31
1200	200	10	66	238	1.8	1.4	1.0	<15	1.3	1.1	0.5	<15
		20	85	307	3.7	3.1	2.0	20	2.3	1.6	1.0	18
		30	102	368	5.5	4.5	2.9	26	3.5	2.2	1.5	22
		• 40	117	423	6.9	5.3	3.5	30	4.0	2.9	1.9	26
		50	132	477	7.3	5.5	3.8	32	4.3	3.4	2.2	28
		60	144	518	7.6	5.8	4.0	34	4.5	3.6	2.2	30
1500	200	10	75	269	1.4	0.8	0.7	16	1.0	0.7	< 0.3	<15
		20	97	351	3.3	2.5	1.7	21	2.0	1.5	0.9	20
		• 30	118	426	4.9	3.8	2.4	26	3.0	2.1	1.4	25
		40	136	491	5.9	4.4	2.9	30	3.7	2.5	1.6	29
		50	151	545	6.1	4.6	3.1	32	3.7	2.8	1.9	31
		60	166	600	6.6	5.1	3.4	34	3.9	3.0	1.9	33

1-Slot, 1-Way Linear

Nominal Length mm	Nominal Inlet Dia. mm	Inlet Static Pressure Pa	Maximum Flow		Maximum Flow Throw (m)*@v_t =				25% Maximum Flow Throw (m)*@v_t =			
			L/s	m³/h	.25 m/s	.50 m/s	.75 m/s	†NC	.25 m/s	.50 m/s	.75 m/s	†NC
600	150	10	20	72	1.7	1.1	0.9	<15	1.1	0.9	< 0.3	<15
		20	26	92	2.4	1.8	1.1	17	1.6	1.1	0.5	<15
		30	30	109	3.3	2.5	1.6	21	2.1	1.5	0.9	15
		40	34	123	4.2	3.2	2.2	24	2.6	2.0	1.3	17
		◉ 50	38	136	5.2	3.7	2.5	27	3.1	2.5	1.6	21
		60	42	150	5.7	4.2	2.8	29	3.6	2.7	1.8	23
900	150	10	31	112	1.6	1.0	0.7	<15	1.1	0.9	< 0.3	<15
		◉ 20	39	140	2.6	2.0	1.5	18	1.6	1.1	0.5	<15
		30	46	167	3.4	2.7	2.0	22	2.1	1.5	0.9	16
		40	53	193	4.2	3.3	2.3	25	2.6	1.9	1.3	18
		50	59	213	5.5	4.3	2.8	28	3.1	2.2	1.6	21
		60	65	233	6.0	4.6	3.1	30	3.6	2.7	1.8	23
1200	200	10	39	141	1.0	0.9	0.7	<15	1.0	0.7	< 0.3	<15
		20	52	189	3.3	2.4	1.5	20	2.0	1.5	0.9	16
		◉ 30	64	230	5.0	3.6	2.1	25	3.2	2.1	1.4	18
		40	73	264	6.2	4.4	2.6	29	3.7	2.6	1.6	21
		50	83	298	6.4	4.6	2.8	31	4.0	3.1	1.9	24
		60	88	319	6.7	5.1	3.3	33	4.2	3.6	2.1	27
1500	200	10	43	153	1.6	1.4	1.1	16	1.1	0.9	< 0.3	<15
		◉ 20	62	222	2.6	2.1	1.6	21	1.6	1.1	0.5	17
		30	77	276	3.7	3.1	2.1	26	2.2	1.5	0.9	21
		40	88	317	4.7	4.0	2.6	30	2.8	1.9	1.3	24
		50	99	358	5.2	4.0	2.8	32	3.1	2.2	1.6	26
		60	107	385	6.0	4.5	3.1	34	3.6	2.7	1.8	28

PERFORMANCE GUIDE in SI (METRIC) UNITS CONTINUED

4-Slot, 2-Way Linear

Nominal Length mm	Nominal Inlet Dia. mm	Inlet Static Pressure Pa	Maximum Flow		Maximum Flow Throw (m)*@v_t =				25% Maximum Flow Throw (m)*@v_t =			
			L/s	m³/h	.25 m/s	.50 m/s	.75 m/s	†NC	.25 m/s	.50 m/s	.75 m/s	†NC
600	200	10	65	235	1.0	0.8	0.6	<15	0.9	0.6	< 0.3	<15
		20	88	317	1.8	1.3	0.8	20	1.1	0.8	0.3	19
		30	109	392	2.4	1.8	1.2	24	1.3	1.0	0.5	23
		• 40	127	457	2.9	2.3	1.7	27	1.7	1.3	0.7	26
		50	142	511	3.4	2.8	2.2	30	2.1	1.5	0.9	29
		60	155	559	3.9	3.3	2.4	32	2.4	1.8	1.2	31
900	200	10	80	290	1.3	1.1	0.9	<15	0.8	0.5	< 0.3	<15
		20	109	392	2.1	1.6	1.1	20	1.3	1.0	0.5	19
		• 30	134	484	2.7	2.1	1.5	25	1.7	1.4	0.8	24
		40	156	562	3.1	2.6	2.0	28	2.0	1.6	1.0	27
		50	175	630	3.7	3.1	2.5	31	2.5	1.9	1.2	30
		60	190	685	4.2	3.6	2.7	33	2.7	2.1	1.3	32
1200	250	10	119	429	2.1	2.0	1.4	<15	1.3	1.0	0.9	<15
		20	163	586	3.0	2.5	1.9	21	2.3	1.8	1.1	20
		• 30	201	726	3.7	3.1	2.4	28	3.3	2.5	1.6	27
		40	234	842	4.5	3.8	2.9	33	3.8	3.2	2.2	32
		50	260	937	5.2	4.3	3.1	37	4.3	3.7	2.5	36
		60	287	1033	5.9	5.0	3.6	39	4.8	4.2	3.0	38
1500	300◊	10	187	673	2.6	2.3	1.7	18	1.3	1.0	0.9	<15
		20	253	912	3.3	2.8	2.2	26	2.3	1.8	1.1	18
		• 30	313	1126	4.2	3.6	2.7	32	3.4	2.7	1.6	24
		40	363	1309	5.1	4.4	3.2	36	4.3	3.5	2.3	30
		50	406	1465	5.8	4.9	3.7	39	4.6	4.0	2.5	34
		60	445	1602	6.3	5.4	4.0	41	5.3	4.5	3.0	36

4-Slot, 1-Way Linear

Nominal Length mm	Nominal Inlet Dia. mm	Inlet Static Pressure Pa	Maximum Flow		Maximum Flow Throw (m)*@v_t =				25% Maximum Flow Throw (m)*@v_t =			
			L/s	m³/h	.25 m/s	.50 m/s	.75 m/s	†NC	.25 m/s	.50 m/s	.75 m/s	†NC
600	200	10	65	235	1.4	1.2	0.7	<15	1.0	0.7	< 0.3	<15
		20	88	317	3.1	2.5	1.7	22	2.0	1.5	0.9	20
		30	109	392	4.7	3.7	2.4	27	2.8	2.1	1.4	25
		• 40	127	457	5.9	4.7	2.9	29	3.4	2.5	1.6	27
		50	142	511	6.1	4.9	3.1	33	3.7	2.8	1.9	31
		60	155	559	6.4	5.4	3.6	35	3.9	3.0	2.1	33
900	200	10	78	283	1.4	1.1	1.0	<15	1.0	0.7	< 0.3	<15
		20	105	378	3.3	2.8	2.0	22	2.0	1.5	0.9	20
		• 30	130	467	4.9	3.9	2.7	28	2.8	2.1	1.4	26
		40	151	545	5.9	4.6	3.2	31	3.5	2.6	1.7	29
		50	170	613	6.4	5.5	3.8	34	4.0	3.1	2.2	32
		60	185	668	6.7	5.8	4.0	36	4.2	3.6	2.2	34
1200	250	10	137	492	4.5	3.7	2.6	<15	2.7	2.1	1.2	<15
		• 20	186	670	5.6	4.7	3.4	23	2.9	2.3	1.4	22
		30	229	826	6.9	6.0	4.2	30	3.6	2.7	1.8	28
		40	266	958	8.5	7.4	5.3	35	4.4	3.4	2.3	33
		50	298	1073	10.7	8.9	6.5	38	5.8	4.6	2.8	36
		60	324	1169	11.2	9.6	7.3	41	6.3	5.4	3.6	38
1500	300◊	10	173	623	4.7	3.8	3.1	16	2.6	2.0	1.1	<15
		20	237	856	6.7	5.8	4.2	23	3.3	2.7	1.8	18
		• 30	294	1060	8.5	7.2	5.1	30	4.0	3.4	2.4	25
		40	341	1228	10.0	8.2	5.9	35	5.0	4.2	3.0	32
		50	381	1372	11.0	9.2	6.8	38	6.4	4.9	3.7	36
		60	418	1506	12.0	10.0	7.6	40	7.4	5.7	4.2	38

All SI (metric) ratings are soft conversion from I-P ratings.
- • Denotes 750 fpm / 3.81 m/s inlet velocity.
- ⊙ Denotes 400 fpm /2.03 m/s inlet velocity.
- * Throw data is for air 20°F/11°C lower than room temperature. Throws for isothermal air are 40 to 50% greater.
- † NC based on L_w(10^{-12} watts reference) -10db.
- - Ratings independently verified by Inchcape Testing Services, ETL Testing Laboratories.
- ◊ Oval shaped inlet.
- - Tested in accordance with ANSI/ASHRAE 70-1991, ANSI S12.31, ARI 890-2001, ISO 5219 and ISO 3741.

The volume of induction air (into the ceiling) required in addition to rated air volume is:

Inlet SP In. Pa	1- and 2-Slots L / s	4-Slots L / s
12	3.3	5.2
25	4.2	6.6
37	5.2	8.0
50	5.9	9.4

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TL Therma-Fuser™ Linear Thermally Powered VAV Diffuser

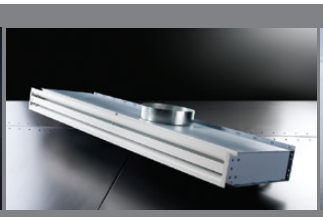
TEN YEAR WARRANTY

Acutherm warrants that its TL diffuser, exclusive of any options and accessories (whether factory or field installed) shall be free from defective material or workmanship for a period of ten (10) years from the date of shipment and agrees to repair or replace, at its option, any parts that fail during said ten (10) year period due to any such defects which would not have occurred had reasonable care and proper usage and all parts and controls remain unaltered. Acutherm makes NO WARRANTY OF MERCHANTABILITY OF PRODUCTS OR OF THEIR FITNESS FOR ANY PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY WHICH EXTENDS BEYOND THE LIMITED WARRANTY ABOVE. ACUTHERM'S LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES RESULTING FROM DEFECTS SHALL IN NO EVENT EXCEED THE COST OF REPAIR OR REPLACEMENT OF PARTS FOUND DEFECTIVE UPON EXAMINATION BY ACUTHERM. IN NO EVENT SHALL ACUTHERM BE LIABLE FOR INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR DAMAGES FOR INJURY TO PERSONS OR PROPERTY. Acutherm shall not be responsible for freight to or from its plant in connection with the inspection, repair or replacement of parts under the terms of this limited warranty nor for cost of removal or installation.

ACUTHERM PRODUCT GUIDE

Square VAV Diffusers

Round VAV Diffusers


Linear VAV Diffusers

Accessories

Pressure Control

Temperature control

PRODUCT INFORMATION DESCRIPTION

Use the following model number nomenclature to order Therma-Fuser diffusers, options and accessories.

Product

(1) Model	(2) Type	(3) Nominal Length	(4) Slots	(5) Blow
TL				

(6) Inlet

Product
1. Model: **TL** Linear Therma-Fuser Diffuser
2. Type: **C** VAV cooling only, **CW** VAV cooling plus warm up, **D** Manually adjustable diffuser, **RAD** Return air, ducted, **RAP** Return air, plenum
3. Nominal Length: **24**, **36**, **48** or **60** in. (**72** in. available for Type-RAP only.) **600**, **900**, **1200** and **1500** mm lengths are available to fit metric ceilings.
4. Slots: **1**-slot, **2**-slot, **4**-slot
5. Blow Direction: **1**-way, **2**-way
6. Inlet: **S** Standard, **O** Opposite, **R** Top Rectangular

Options

(1) Remote Adjust	(2) Insulation	(3) Sensor	(4) End

Options
1. Remote Adjust: **DA1** or **DA1M** (**DA2** or **DA2M** for 4-slot) for Digital Wall Adjuster. **WA1M** (or **WA2M** for 4-slot) for Wireless Wall Adjuster.
2. Insulation: **I** Internal insulation
3. Sensor: **AS** for DSMC or for 3rd party
4. Ends: **TEG** for Reveal, or **MP** for Thin Tile

Accessories

(1) Ceiling Frame

Accessories
1. Frames: **AC-TL-HCF** for Hard Ceiling, **AC-TL-TEG1** for tegular 9/16" T-Bar (requires +TEG end-angles), and for thin metal tiles use +MP end-angles

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